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In brief

Professor Raul Tempone and Professor Omar Knio will host the 2016 Advances in **Uncertainty Quantification Methods Algorithms and Applications (UQAW) Conference** from January 5 to 9, 2016. For more information, visit http://sri-uq.kaust.edu.sa.

The Office of the Arts and the Office of Enrichment Programs presents a special performance of **William Shakespeare's "Hamlet"** put on by an international theater company on **Saturday, January 9, 2016 at 2:00 and 7:30 p.m.** For more information, please contact artsoffice@kaust.edu.sa.

The **2016 Winter Enrichment Program (WEP) will run from January 9 to 22** and will include a range of keynote lectures on topics ranging from science in Hollywood films to polar exploration to the future of the energy industry. This year's WEP will celebrate the themes of climate change and sustainability. Registration is now open at wep.acadox.com.

All members of the KAUST research community and external industry partners and Saudi universities are invited to attend the KCC Symposium entitled 'Catalysis for Artificial Photosynthesis' from **February 1 to 3, 2016.** For more information and to register, visit **www.kaust.edu.sa/events/kcc-2016.**

On February 24 and 25, 2016, KAUST will welcome representatives from the University's industrial and scientific partners to the campus for the seventh annual **KAUST Industry Advisory Board (KIAB) meeting.**●

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Accolades

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Hadjichristidis receives prestigious medal

Nikos Hadjichristidis, KAUST Physical Science and Engineering Division professor of chemical science, recently received the prestigious 2016 Macro Group U.K. Medal for Continued Outstanding Achievement in Polymer Science. The award will be presented at the Warwick Polymer Conference in the U.K. in July 2016 after Hadjichristidis gives a keynote lecture.

This is the third major award Hadjichristidis has received for significant advances in polymer chemistry. He was previously honored with the International Award of the Society of Polymer Science, Japan, 2007 and the 2015 American Chemical Society National Award for Polymer Chemistry, U.S.

His achievements include the creation of unique macromolecular architectures that were not previously synthetically accessible. Among them are H- and pom-pom-shaped molecules, miktoarm stars (a term he coined), cyclic-block copolymers, dendritic copolymers and diverse grafted copolymers.

Hadjichristidis joined KAUST in 2011 from the University of Athens where he was a professor in the Department of Chemistry until 2010. His goal at KAUST has been to build a world-class Polymer Synthesis Laboratory that contributes to discoveries in four main areas: water research, solar cells, petrochemical research and CO2 capture.

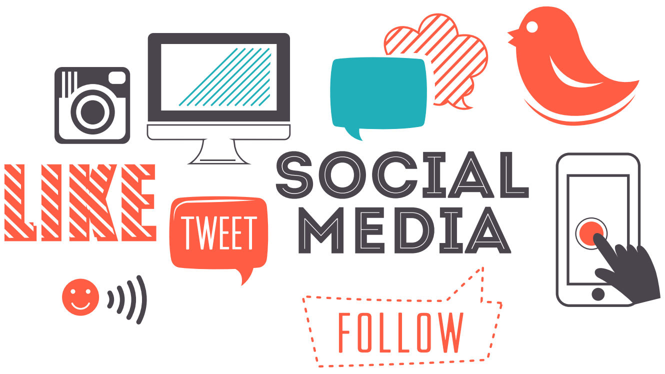
His research at KAUST focuses mainly on the synthesis of novel homopolymers, copolymers and hybrids (polymers/polypeptides, polymers/CNT) with well-defined complex macromolecular architectures by using anionic polymerization (AP) high vacuum techniques and combinations of AP with other polymerization methodologies.●

Charlotte Hauser
elected NAI Fellow

Charlotte Hauser, KAUST professor of bioscience, has been elected to the rank of NAI Fellow by the National Academy of Inventors (NAI). The 2015 Fellows Selection Committee has officially recognized Hauser for her "highly prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development and the welfare of society."

Hauser, along with Jean Fréchet, KAUST vice president for research, will represent the University as NAI inductees this year. Hauser and Fréchet join an impressive list of Nobel laureates, presidents and senior leadership of research universities, inductees of the National Inventors Hall of Fame, recipients of the U.S. National Medal of Technology and Innovation, recipients of the U.S. National Medal of Science, Lemelson-MIT prize recipients, AAAS Fellows and IEEE Fellows.

Hauser's research interests lie at the interfaces of chemistry, biomedicine, bioengineering and nanotechnology. Her focus is on the development of platform technologies using smart nanomaterials for regenerative biomedical and environmental applications. She is currently working on the rational molecular design, synthesis and mechanistic understanding of novel supramolecular structures. ●



Here's a roundup of KAUST-related content you shouldn't miss

KAUST Climate Change Research - Recent events at COP21 put climate change on the global agenda in an unprecedented way. See how KAUST research is contributing to a cleaner future for the Kingdom and the world. **http://www.kaust.edu.sa/climatechange/**

KAUST launched a new Snapchat channel. If you're not on Snapchat, you're missing out on some seriously great content. See what's happening on campus and in the community at [url]

Watch Falling Walls - Ahmed Alfadhel recently enjoyed a minute of fame. Watch his 60 second presentation at the 2015 Falling Walls event in Berlin. **https://vimeo.com/147489828**

Carlos Duarte made a splash at COP21 with his talk about seagrass. Learn more courtesy of the Sydney Morning Herald. **http://goo.gl/QpTKsV**

CEMSE and PSE recently teamed up to observe the Year of Light. See the photos from this and other events on the KAUST Official Flickr photo stream. **https://www.flickr.com/photos/kaust_photos/** ●

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1. Nikos Hadjichristidis, KAUST professor of chemical science, won the 2016 Macro Group U.K. Medal for Continued Outstanding Achievement in Polymer Science.

KAUST celebrates **sixth Commencement ceremony**

By Caitlin Clark

KAUST celebrated its sixth annual Commencement ceremony on December 18, 2015. One hundred master's degree and 71 Ph.D. graduates were welcomed into the KAUST global alumni community by members of the University's senior leadership, faculty, students, distinguished guests from industry and academia and the KAUST community.

In a ceremony presided over by University Marshal Professor James Calvin, vice president for academic affairs, and His Excellency Ali Ibrahim Al-Naimi, chairman of the KAUST Board of Trustees, President Jean-Lou Chameau told the graduates, their families and guests that he hoped the students' academic journeys enabled their passion for learning to "grow immensely."

"We have witnessed your curiosity, tenacity and devotion to academic pursuits," Chameau said. "I am certain that your spirit will add to the culture of exploration and discovery in the world…and that you leave us with big dreams and aspirations."

However, Chameau also told the students they should approach their futures knowing "there is no straight path from where you sit today to all the things you will do and places you will go."

As scientists, he said, the graduates should be drawn towards uncertainty and "driven to explore uncharted territory." Only through that exploration will they not "miss all the unforeseen opportunities that may become the defining moments in [their] professional journeys," he added.

Class of 2015 student speaker Mohammed Alnassar, a Ph.D. graduate in Electrical Engineering, echoed Chameau's remarks in his speech.

Alnassar described how, after finishing his master's degree in Canada, he and his wife moved back to Saudi Arabia, where he began working for Saudi Aramco. Late one night he received a call from his boss, who told him Aramco would sponsor him for his Ph.D. at KAUST. There was just one catch—the application deadline was the next day, and he had only that night to apply.

Fortunately for Alnassar, luck was on his side—he completed his application and was accepted to KAUST. Although his journey to receive his Ph.D. was not an easy one, he stayed motivated because of three important lessons he learned during his time at the University.

"First, opportunities come once, so don't wait—grasp them before they are gone," he told the audience. "Second, be prepared for any change you decide to take in your life—welcome that change and learn to deal with uncertainty. Third, be passionate, persistent and—most importantly—patient. It is never over until you quit trying."

Graduates also heard remarks from 2015's distinguished Commencement speaker Lubna S. Olayan, CEO and deputy chairman of the Olayan Financing Company. Twice named to Forbes' list of the 100 most powerful women in the world and considered to be a visionary leader, Olayan is one of the most influential businesswomen in the world.

In his closing remarks, Chameau told the graduates to "remain open to the unexpected in life—to the new possibilities. Today you leave KAUST prepared to contribute to society not simply as scientists, mathematicians, engineers, researchers and entrepreneurs, but ready to serve as leaders, global citizens, innovators and scholars.

"As you go forth in your lives and careers, remember that each one of you is an ambassador for KAUST. You were drawn here to learn, to grow, to be inspired…You leave now prepared to make your mark on the world—perhaps to change the world. You are ready, and we are proud of you." ●

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حفل التخرج السادس لجامعة
الملك عبدالله للعلوم والتقنية

احتفلت جامعة الملك عبدالله بتخريج الدفعة السادسة من طلبتها وذلك في حفل كبير اقيم في حرمها الجامعي في الثامن عشر من ديسمبر عام 2015. وتوج الحفل بتخريج 100 خريجاً بدرجة الماجستير و71 خريجاً بدرجة الدكتوراه بحضور أعضاء القيادة العليا للجامعة وأعضاء هيئة التدريس وطلبة الجامعة ومجموعة من الضيوف البارزين من الأوساط الصناعية والأكاديمية وأعضاء مجتمع جامعة الملك عبدالله.

وأُستهل الحفل بقدوم المسيرة الاكاديمية وعلى رأسها قائد مسيرة الخريجين البروفسور جيمس كالفن، نائب الرئيس للشؤون الأكاديمية، ومعالي المهندس علي بن إبراهيم النعيمي، رئيس مجلس الأمناء، والدكتور جان-لو شامو، رئيس جامعة الملك عبدالله للعلوم والتقنية الذي ألقى كلمة بهذه المناسبة إلى الخريجين وعائلاتهم والضيوف عبر فيها عن عميق أمله في أن تزيد هذه الرحلة الأكاديمية من شغف الطلبة للعلم بشكل كبير، وقال:" لمسنا فيكم الفضول والمثابرة والتفاني في تحقيق أهدافكم الأكاديمية. وأنا واثق من أنكم تمتلكون الروح والعزيمة الصادقة التي تمكنكم من تعزيز ثقافة البحث والاكتشاف في العالم بما يحقق أمالنا وتطلعاتنا الكبيرة. أعلموا أنه لا يوجد طريق واحد محدد لبلوغ هدفكم بل يجب عليكم اكتشاف كل الطرق وزيارة كل الأماكن. وأوصيكم كعلماء بالسعي لدراسة واستكشاف كل مجهول وغامض حتى لا تفوتوا على أنفسكم اكتشاف فرص غير متوقعة قد تشكل لحظات إنجاز مهمة في رحلتكم المهنية. "

ثم القى الطالب محمد النصار خريج درجة الدكتوراه في الهندسة الكهربائية والمتحدث باسم دفعة 2015، كلمة أكد فيها على النقاط الهامة التي تضمنتها كلمة الرئيس شامو الافتتاحية. كما شارك الحضور قصة التحاقه في جامعة الملك عبدالله حيث تحدث عن عودته مع زوجته من كندا إلى المملكة بعد حصوله على درجة الماجستير وكيف أنه بدأ العمل في شركة أرامكو السعودية. وكيف أنه في أحد الأيام تلقى اتصالاً من رئيسه في وقت متأخر من الليل يخبره أن شركة أرامكو ترحب باكماله درجة الدكتوراه في جامعة الملك عبدالله. حيث أن آخر موعد لتقديم طلبات الالتحاق هو في اليوم التالي، وكان لديه فقط تلك الليلة ليقرر ويقدم الطلب. ولحسن حظه تمكن من إكمال طلب الالتحاق في الوقت المحدد وتم قبوله في الجامعة. وعلى الرغم من أن رحلته لدرجة الدكتوراه لم تكن سهلة، إلا أنه بقي متفائلاً بسبب ثلاثة دروس مهمة تعلمها خلال الفترة التي قضاها في الجامعة وهي على حد قوله: "أولا: الفرص لا تأتي إلا مرة واحدة، لذلك حاول استغلالها قبل فوات الأوان. ثانياً: كن مستعداً لأي تغيير يحدث في حياتك وحاول أن ترحب به وتتعامل معه بكل غموضه. ثالثاً: التحلي بالشغف والثبات والكثير من الصبر. فلا مستحيل إلا إذا توقفت عن المحاولة ".

ثم استمع الخريجون إلى كلمة السيدة لبنى العليان، المتحدثة الرسمية لحفل التخرج لعام 2015، والرئيس التنفيذي ونائب رئيس مجموعة العليان المالية والتي تم ترشيحها مرتين في لائحة فوربس لأقوى 100 امرأة في العالم، وهي أيضاً واحدة من سيدات الأعمال الأكثر نفوذاً في العالم.

ونصح الرئيس شامو الخريجين في كلمته الختامية بقوله: " أبقوا منفتحين إلى ما هو غير متوقع في الحياة -إلى كل ما هو جديد. اليوم تغادرون جامعة الملك عبدالله وانتم على أهبة الاستعداد للمساهمة في خدمة المجتمع ليس فقط كعلماء ومهندسين وباحثين و رواد أعمال، بل كقادة عالميين مبدعين. وتذكروا أن كل واحد منكم هو سفير للجامعة. لقد قادتكم المعرفة إلى هذا المكان لتنمو وتكونوا مصدر إلهام. وأنتم الآن جاهزون لأن تتركوا بصماتكم على العالم، وربما لتغيير العالم. أتمنى لكم التوفيق، ونحن فخورون جداً بكم."●

1. KAUST President Jean-Lou Chameau
2. Distinguished Commencement Speaker Lubna S. Olayan
3. Class of 2015 Student Speaker Mohammed Alnassar

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1. KAUST Academic Affairs Vice President James Calvin hoods doctoral candidate Ahmed Alsaggaf.

2. University Marshal James Calvin leads the academic procession of the 2015 commencement ceremony.

3. The KAUST Board of Trustees and University administrators.

4. The Computer, Electrical and Mathematical Science and Engineering master's degree candidates' procession

5. Lina Abdul Halim receives her Ph.D degree from Professor Osman Bakr.

6. The Physical Science and Engineering master's degree candidates' procession

7. The Biological and Environmental Science and Engineering master's degree candidates' procession

8. A newly hooded Ph.D. shares his triumph.

9. The doctoral candidates' procession

10. Dean Mootaz Elnozahy, left, and KAUST President Jean-Lou Chameau congratulate Abeer Aldoghaither on the award of her Ph.D. degree.

11. Students toss their caps in the air in celebration of their advanced degrees.

12. Happiness is sharing the rewards of your hard work with friends and family.

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The role of **applied mathematics in finance**

By Meres J. Weche

"Sometimes there's a strange dichotomy between applied mathematics and pure mathematics," said Professor Raul Tempone, a founding KAUST faculty member and principal investigator of the University's Stochastic Numerics Research Group. "People think that applied math is simply the application of theory." The argument is that applied math is just classified by its ends in the sense that one is trying to solve a real problem.

Tempone argues that this doesn't mean that new theories don't need to be created. It also does not mean that the kinds of problems are less challenging than the ones faced in pure math. "Sometimes it's more difficult to formulate and it's harder to solve from the theoretical point of view. Applied math does require theory, and quite deep theory, actually," he said.

A prime example of how the field of applied mathematics has necessitated the development of novel theories to ensure its continued efficiency is in the world of finance, and specifically in European options pricing. An option is a derivative which gives its holder the right to buy or sell a particular financial security in the future for a given price. In the case of European options, this right can only be exercised at maturity, the time at which the option contract expires.

To illustrate, Fabián Crocce, a postdoctoral fellow from the group, explains: "Options are kind of an insurance contract, and our goal is to put the right price to that contract to compute the premium. If someone needs to buy certain amount of oil in one year, it's important to ensure some protection from price fluctuations on that commodity."

Basically, the buyer needs assurances that he or she will have enough money to acquire the oil needed regardless of sudden market fluctuations. The buyer may purchase a call option to set a guaranteed upper limit for the price. "It's similar to how insurance companies compute the price of your car insurance," Crocce explained. We're essentially paying to cover ourselves from the randomness in the middle.

"There's a fair price and the goal is to compute the fair price. This is what option pricing is about," Ph.D. student Juho Häppölä, also from Tempone's group, further explained.

Using Fourier methods for pricing options

In a research article due to appear in The Journal of Computational Finance entitled "Error analysis in Fourier methods for option pricing," Tempone, Crocce, Häppölä and collaborator Jonas Kiessling outline their method for pricing European options by tuning the parameters in a systematic way to achieve the required accuracy with minimal computational work.

"The idea is that this could be implemented in a computer to run automatically and not just through trial and error, but by inputting parameters and yielding accurate prices for the options contracts," Tempone explained.

Financial derivative securities are used, among other things, to buy or sell financial securities in advance to ensure against adverse market movements by arranging today the price of an asset in the future. The price of derivatives is often evaluated using a simplified assumption of the world — a model. The role of the model is to distill the immense complexity of the markets into a handful of parameters. Like all financial contracts, given a model, options have a value implied by that model. Ideally, that model price is very close to the price at which one is actually able to buy or to sell that option.

A pioneering model from the 1970s for option pricing was the Black-Scholes model. This model not only laid the groundwork for much of what we know as quantitative finance today, but gave rise to a definitive pricing formula that was easy to evaluate. However, demonstrating how applied mathematics also spurns new theories, newer methods have since been developed to extend upon the work of Black and Scholes. These extensions allow for modelling many phenomena that are absent in the original work by Black and Scholes, such as real-time pricing and taking into account important factors like stochastic volatility and jumps. Many of these recent mathematical techniques make use of Fourier transforms. These transforms are named after French mathematician Joseph Fourier (1768-1830), who developed them for the purpose of studying heat flow in matter. Since the 1960s, this methodology has seen a renaissance reaching far beyond its original intended purpose, including option pricing.

The most realistic financial models must indeed take into account jumps related to large market movements. Pricing options in the presence of jumps requires delving into partial integro-differential equations (PIDEs).

"This brings a lot of interesting mathematics and a lot of twists," said Tempone.

In mathematics, an integro-differential equation is an equation that involves both integrals and derivatives of a function. Those

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equations represent a pivotal part of mathematical modeling in many fields of science and engineering, as well as when taking into account real world problems.

How academia interacts with the trading floor

Tempone's group that makes up the core of the KAUST Strategic Research Initiative for Uncertainty Quantification represents a good mix of people with both theoretical and financial market experiences. Ph.D. student Häppölä completed a master's degree in theoretical physics and worked in commodity markets for a large energy company.

"I got bitten pretty 'big time' by the financial bug there, but I still felt like I wanted to come back to academia to pursue a Ph.D.," he said. Häppölä also has a sense of adventure, so when he learned about the opportunity to come to KAUST from a friend who was already at the University, he jumped at the opportunity.

Postdoctoral fellow Crocce completed his Ph.D. in mathematics in his native Uruguay. He comes from a pure math background and enjoys delving into theoretical matters. He also has a background in mathematical finance.

"It's a nice group because all the backgrounds from industry to the theoretical side are represented," he said. "Pure math is beautiful and I would like to go back at some point, but it's also good to see how things are actually applied and to get your hands dirty."

"I'm very happy to have this vibrant team and the other lines we pursue in the group. This is essentially computational finance at the core," said Tempone. ●

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1. Three members of the Stochastic Numerics Research Group (left to right) Juho Häppölä, Raul Tempone and Fabián Crocce stand together in the University's Al-Khawarizmi building on November 29, 2015. By Nicholas Demille.

دور الرياضيات التطبيقية في الحسابات المالية

يقول البروفيسور راوول تمبون، عضو هيئة تدريس مؤسس في جامعة الملك عبدالله والباحث الرئيسي للمجموعة التي تعمل على أبحاث النظم العددية العشوائية (Stochastic Numerics Research Group): "هناك اعتقاد لدى الناس أن الرياضيات التطبيقية تعني مجرد تطبيق النظريات. ويرجع السبب إلى أن الرياضيات التطبيقية تُصنف فقط من خلال أهدافها النهائية والتي في الغالب موجهة لحل مشكلة حقيقية".

ويوضح البروفيسور تمبون : "هذا لا يعني أننا لسنا بحاجة إلى نظريات جديدة أو أن المشاكل التي تسعى الرياضيات التطبيقية لحلها هي أقل صعوبة من تلك التي نوجهها في الرياضيات التقليدية". ففي بعض الأحيان تكون المشاكل أكثر صعوبة وتصبح صياغة النظريات تحدياً كبيراً. وأكد بقوله: "في الواقع، تحتاج الرياضيات التطبيقية إلى نظرية، بل ونظرية راسخة جداً." ونجد في عالم المال أبرز الأمثلة التي تشرح كيف أن مجال الرياضيات التطبيقية استوجب تطوير نظريات جديدة، وعلى وجه التحديد في تسعير عقود الاختيار المالية الأوروبية وهي أداة مالية استثمارية تعطي حاملها الحق في شراء أو بيع ضمانات مالية معينة في المستقبل وبسعر معين شرط أن يتم ذلك بعد نهاية صلاحية العقود.

ويوضح فابيان كروتشي، زميل ما بعد الدكتوراه من فريق أبحاث البروفيسور تمبون، قائلا: "تعتبر عقود الاختيار المالية نوعاً من أنواع عقود التأمين، وهدفنا هو وضع السعر المناسب لهذه العقود من أجل حساب علاوة السندات. فعلى سبيل المثال لو أراد شخص ما شراء كمية معينة من النفط في عام واحد، فمن المهم الحصول على بعض الضمانات من تقلبات الأسعار على تلك السلعة". ويحتاج المشتري إلى تأكيدات أنه سيمتلك ما يكفي من المال للحصول على النفط المطلوب بغض النظر عن تقلبات السوق المفاجئة. ويمكن للمشتري شراء عقد خيار مالي لتحديد أعلى حد مضمون للسعر. ويضيف كروتشي: "يتشابه هذا مع ما تقوم به شركات التأمين لحساب سعر التأمين على سياراتنا. حيث ندفع لها قيمة عقد لتغطية أنفسنا مما قد يحدث من ظروف عشوائية في الحياة." وعقَّب طالب الدكتوراه يوهو ابولا على ذلك بقوله: "هناك سعر عادل والهدف هو حساب هذا السعر العادل. وهو أساس عملية تسعير عقود الاختيار المالية ".

استخدام تحويل فورييه (Fourier) لتسعير عقود الاختيار المالية

وفي مقال بحثي مقرر نشره في مجلة الحوسبة المالية (The Journal of Computational Finance) بعنوان "تحليل الخطأ في تحويل فورييه لتسعير عقود الاختيار المالية" قام كل من تمبون وكروتشي وابولا والباحث المتعاون جوناس كيسلينج بشرح طريقتهم لتسعير عقود الاختيار المالية الأوروبية من خلال ضبط المعاملات بطريقة منهجية لتحقيق الدقة المطلوبة في الحد الأدنى من العملية الحسابية. ويوضح تمبون هذه الطريقة بقوله: "الفكرة هي استخدام الحاسب الآلي لعمل الحسابات تلقائياً عن طريق إدخال المعاملات والخروج بأسعار دقيقة لعقود الخيارات المالية".

وأحد أهم النماذج الرائدة لتسعير عقود الاختيار المالية منذ السبعينات هو نموذج بلاك سكولز (Black-Scholes) الذي يعتبر الأساس لمعظم ما نعرفه عن التمويل الكمي اليوم، فضلاً عن دوره في طرح صيغة تسعيرة نهائية يمكن تقييمها بسهولة. وبفضل الرياضيات التطبيقية تم استحداث نظريات وأساليب جديدة ساهمت في تطوير نموذج بلاك سكولز خصوصاً في بعض الظواهر التي لا يمكن له نمذجتها، مثل التسعير في الوقت الفعلي، ومراعاة عوامل هامة مثل القفزات والتقلبات العشوائية لأسعار السندات. وتستفيد معظم هذه التقنيات الحسابية الحديثة من تحويل فورييه (Fourier) المنسوب إلى عالم الرياضيات الفرنسي جوزيف فورييه (1768-1830)، الذي طورها لغرض دراسة تدفق الحرارة في المواد. ثم أدخلت عليها تطويرات وتحديثات منذ ستينات القرن الماضي وأصبحت من أهم الطرق لتسعير عقود الاختيار المالية. ويجب على النماذج المالية الأكثر واقعية أن تأخذ في الاعتبار القفزات المتعلقة بالتحركات الكبيرة في السوق. لذلك تتطلب عملية تسعير عقود الاختيار المالية - في ظل وجود قفزات في السوق - استخدام المعادلة التكاملية- التفاضلية الجزئية (PIDEs) والتي وصفها البروفيسور تمبون بأنها تقدم الكثير من الحسابات الرياضية المثيرة للاهتمام والمتقلبة. وتمثل مجموعة البروفيسور تمبون البحثية جوهر مبادرة الأبحاث الاستراتيجية في مجال قياس الغموض الكمي في جامعة الملك عبدالله، والتي تضم مجموعة متميزة من أصحاب الخبرات النظرية والمالية في السوق مثل طالب الدكتوراه يوهو ابولا الحاصل على درجة الماجستير في الفيزياء النظرية، والذي عمل في أسواق السلع الأساسية لشركة كبيرة في مجال الطاقة، وزميل ما بعد الدكتوراه كروتشي الحاصل على درجة الدكتوراه في الرياضيات من بلده الأصلي أوروغواي، ولديه خبرة في مجال الرياضيات التقليدية والمالية ولكنه يستمتع في الخوض في المسائل النظرية. ووصف ابولا فريقه البحثي قائلاً: "إنه فريق جيد يمتلك جميع الخبرات والخلفيات من مجالات الصناعة وصولاً إلى المجالات النظرية. ●

9-22
JAN 2016

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WINTER ENRICHMENT PROGRAM

#WEP2016

1. The Algae House Project
(with Stefan Hindersin)

2. The real science behind climate change
(with Georgiy Stenchikov)

Sustainability at WEP 2016

Sustainability is one of the most important issues in today's world and is a key theme for the upcoming Winter Enrichment Program (January 9-22). Our upcoming January program looks at sustainability from a variety of angles, from our opening keynote lecture to special tours. Here are a few of our sustainability-related events:

Leadership and innovation in environmental sustainability: The future of Saudi Arabia - Sunday, January 10

A Keynote Lecture with H.E. Eng. Abdullatif Ahmed Al Othman

Governor and Chairman of the Board of Directors of the Saudi Arabian General Investment Authority (SAGIA)

For our opening night keynote lecture, the Governor of SAGIA, His Excellency Abdullatif Al Othman joins us to shed light on the role science and innovation will play in developing the sustainable industries of Saudi Arabia in the future.

The real science behind climate change (with Georgiy Stenchikov) - January 11 - 12

Want to understand climate change from a real scientific perspective? Join Dr. Georgiy Stenchikov for our two afternoon seminar 'The Real Science behind Climate Change', featuring international, in-Kingdom and KAUST climate experts sharing their knowledge with lectures and interactive sessions on climate research, climate prediction and sustainability.

A dual role for plant cell walls: Advances in human health and biofuel production (with Geoff Fincher) - Sunday, January 17

Join Prof. Geoff Fincher as he looks at recent advances in human health and biofuel production through work on plant cell walls, leading to applications beyond human health and biofuel production in the future.

Sustainability at KAUST (with Amr Atiah, Manager for Operations & Sustainability, KAUST) - Monday, January 18

Join KAUST manager for Operations & Sustainability Amr Atiah as he describes the strong link between KAUST and Sustainability, the LEED Certification for Academic Campus, the Sustainability Committee and various Sustainability Initiatives that have been implemented in our community.

Fresh water or fresh ideas? The move toward sustainable practices in world food and agriculture (with Ryan Lefers) - January 17 - 19

Center for Desert Agriculture and Water Desalination and ReUse Center, KAUST

This three-day workshop kicks off our 'Future of Food' day. During the workshop, participants will evaluate the current state of agricultural fresh water and resource use at multiple points in the global food supply and consumption chain, then discuss new, alternative technologies for food production that have the potential to significantly reduce the freshwater and resource footprint of world agriculture.

The Algae House Project (with Stefan Hindersin) – Wednesday, January 20

Dr. Stefan Hindersin will introduce the world's first 'Algae House', where Microalgae is integrated into a building as a way to create production of sustainable microalgal biomass.

KAUST Catalysis Center discusses energy and environment challenges (with Kazuhiro Takanabe, Wei Xu, Jean Basset, Kuo Wei Huang, Valerio D'Elia and Paul Lucchese) - Thursday, January 21

Join international, KAUST and in-Kingdom speakers for a discussion on the current energy environment and the challenges facing researchers today.

For registration and more details on these and many other events, visit wep.acadox.com

To stay in touch with WEP 2016, like our Facebook page: www.facebook.com/enrichmentatkaust

If you have questions related to WEP 2016, please contact the Office of Enrichment at

contactwep@kaust.edu.sa. ●

Solar Future 2015 Symposium

By Meres J. Weche

KAUST welcomed a prestigious group of local and international solar energy sector experts from academia and industry to the University's Solar Future 2015 Symposium on November 7-11, 2015. The event focused on the most recent results in the field of solar energy conversion (photovoltaics). Representatives came from national laboratories, government institutions and universities. The three-and-half-day symposium featured keynote presentations, plenary talks and poster sessions. The event was organized by the KAUST Solar and Photovoltaics Engineering Research Center (SPERC), with the support of the KAUST Office of Sponsored Research and the KAUST Industry Engagement Office.

Emerging solar energy technologies

Solar Future 2015 innovated from the previous series of symposia by delving into both emerging and mature technologies paving the way towards the future of solar energy at high efficiency and low cost. As Ahmed O. Al Khowaiter, Saudi Aramco's chief technology officer, mentioned in his keynote address, the cost of photovoltaics (PV) has gone down in recent years and is in many ways competitive with energy market prices even in the Kingdom.

"We've achieved a lot, but we've got a long way to go as well, " he said. The challenge is to find ways to "scale up the industry as quickly as possible, maintaining the momentum we've had over the last five years while ensuring the sustainability of growth," he noted. The key is essentially to make solar energy much more competitive and scalable.

As part of his talk, KAUST Professor Aram Amassian from the University's Organic Electronics & Photovoltaics Group explored interesting applications opening up within the context of thin-film photovoltaics. One of the key aspects of the materials related to the latter is that they can be solution manufactured and solution printed. "We should be thinking about the science knowledge-base to build a mature industry around solution printing," said Amassian.

While Amassian's group at KAUST looks at solution manufacturing from a materials-agnostic perspective, he focused his address at the Solar Future symposium on organics. "There are really interesting challenges there as well as a lot of interesting science," he pointed out. Being able to manufacture the type of solution that could be applied to large areas with high throughput could dramatically reduce the cost of PV.

When we think about solar cells, the emphasis shouldn't be only on the absorbing material; it's also about the whole electron collecting or electron collecting layers (or electron transporting layers). "That has to be part of the equation for making a really efficient all-solution manufacturing solar cell," Amassian explained. It doesn't really matter what the ink is; it could be quantum dots, molecules or polymers.

This ink formulation has to be delivered somehow onto a substrate. The method typically used in the laboratory is spin coating. Amassian, however, is interested in moving to something that is more large-area compatible, like flat substrates or a spray coating method that can be applied to more complicated substrates. Eventually this would be done on a large scale.

"It's about bringing two worlds together," said Amassian. "These are the world of ink-based manufacturing and solution processing and the world of surface science and vacuum-based sort of thin-film science where there's a lot of maturity."

Organics advances in a silicon world

Focusing on organic photovoltaic cells (OPV), Professor Karl Leo from Technische Universität Dresden and former director of SPERC at KAUST gave a talk on the current progress and future outlook for organic solar cells. Leo is also the founder of Heliatek, the current world record holder for organic solar cell efficiency at 12%. He said it's surprising and also disappointing that this record still stands after three years. "I think we would need further progress to achieve a broad application," he said.

"It's really clear that the benchmark for photovoltaics is silicon," Leo clarified. Where, then, is the place for power applications on organics? In order to be suitable for power applications, "organics should reach module efficiency of more than 50%, and the cost must be significantly lower than what silicon can offer," he noted. Leo believes that this will happen in the longer-term future, but, in the meantime, short-term applications have begun to be implemented with building integrations.

Heliatek has recently implemented a pilot project in Singapore in the form of flexible panels for a walkway with an average cell efficiency of 7%. "Those numbers are not really sufficient, but the roadmap is very clear that in the near future they'll be around 10%, and in 20 years is when the broad market penetration will be possible," said Leo. The key commercial advantage of the panels is that they can also be made in virtually any color. For building integrations, architects love the colors blue, green and black. "Don't come to an architect with brown, pink or reddish colors," he said.

KAUST research recognized

Professor Jean-Luc Bredas, director of the SPERC, spoke at the symposium about how the performance of organic photovoltaic devices strongly depends on the intermolecular arrangements at the donor/fullerene interfaces. SPERC seeks to strengthen its current core competencies in emerging technologies—organics and hybrids, quantum dots and perovskites—and to enter the more established crystalline silicon and inorganic thin film technologies.

Bredas has been conducting groundbreaking theoretical research into new organic materials that can be exploited for novel generations of devices based on organics used as semiconductors. Such devices include light-emitting diodes for displays, field-effect transistors and organic solar cells.

Bredas has received the American Chemical Society's ACS Award in the Chemistry of Materials. He will be honored at the awards ceremony to be held on March 15, 2016 in conjunction with the 253rd ACS National Meeting in San Diego, California, U.S . ●

ندوة مستقبل الطاقة الشمسية 2015

استضافت جامعة الملك عبدالله للعلوم والتقنية ندوة مستقبل الطاقة الشمسية 2015 في الفترة من 7-11 نوفمبر بحضور مجموعة بارزة من الخبراء المحليين والدوليين في مجال الطاقة الشمسية من الأوساط الأكاديمية والصناعية فضلاً عن ممثلين من المختبرات الوطنية والمؤسسات الحكومية والجامعات. وركزت الندوة على أحدث النتائج التي تم التوصل لها في مجال تحويل الطاقة الشمسية. وشملت الندوة التي استمرت ثلاثة أيام ونصف على عروض تقديمية رئيسية، ومحادثات عامة ومعرض لملصقات الأبحاث. وقد تم تنظيم هذا الحدث من قبل مركز أبحاث الطاقة الشمسية والخلايا الضوئية في الجامعة (SPERC)، بدعم من مكتب جامعة الملك عبدالله لدعم الأبحاث وبرعاية من مكتب التعاون الصناعي في جامعة الملك عبدالله.

تقنيات الطاقة الشمسية الناشئة

تميزت ندوة مستقبل الطاقة الشمسية 2015 لهذا العام في طرحها لمواضيع عن التقنيات الناشئة حديثاً وتلك التي تم تطويرها منذ فترة وجيزة، كما تطرقت لمستقبل الطاقة الشمسية وكيفية رفع كفاءتها وخفض تكلفتها. وتحدث أحمد الخويطر، الرئيس التنفيذي للتقنية في شركة أرامكو السعودية، في كلمته الرئيسية التي ألقاها في الندوة، عن انخفاض تكلفة تصنيع الخلايا الضوئية (PV) في السنوات الأخيرة إلى حد تنافسي يتوافق مع أسعار السوق العالمي للطاقة بما في ذلك سوق الطاقة في المملكة. وقال "لقد أنجزنا الكثير، ولكن لا يزال الطريق طويلاً. والتحدي هنا هو في رفع مستوى الإنتاج الصناعي في أسرع وقت وبنفس العزيمة التي حققناها على مدى السنوات الخمس الماضية مع ضمان استدامة النمو وتحقيق الهدف الأساسي وهو جعل الطاقة الشمسية أكثر قدرة على المنافسة وقابلة للتطوير." كما ألقى البروفيسور أرام أماسيان من فريق الإلكترونيات العضوية والخلايا الضوئية في جامعة الملك عبدالله كلمة عن اكتشاف تطبيقات مهمة للخلايا الضوئية الرقيقة تساهم في وضع حلول لتطوير تقنية تصنيع أو طباعة الإلكترونيات.

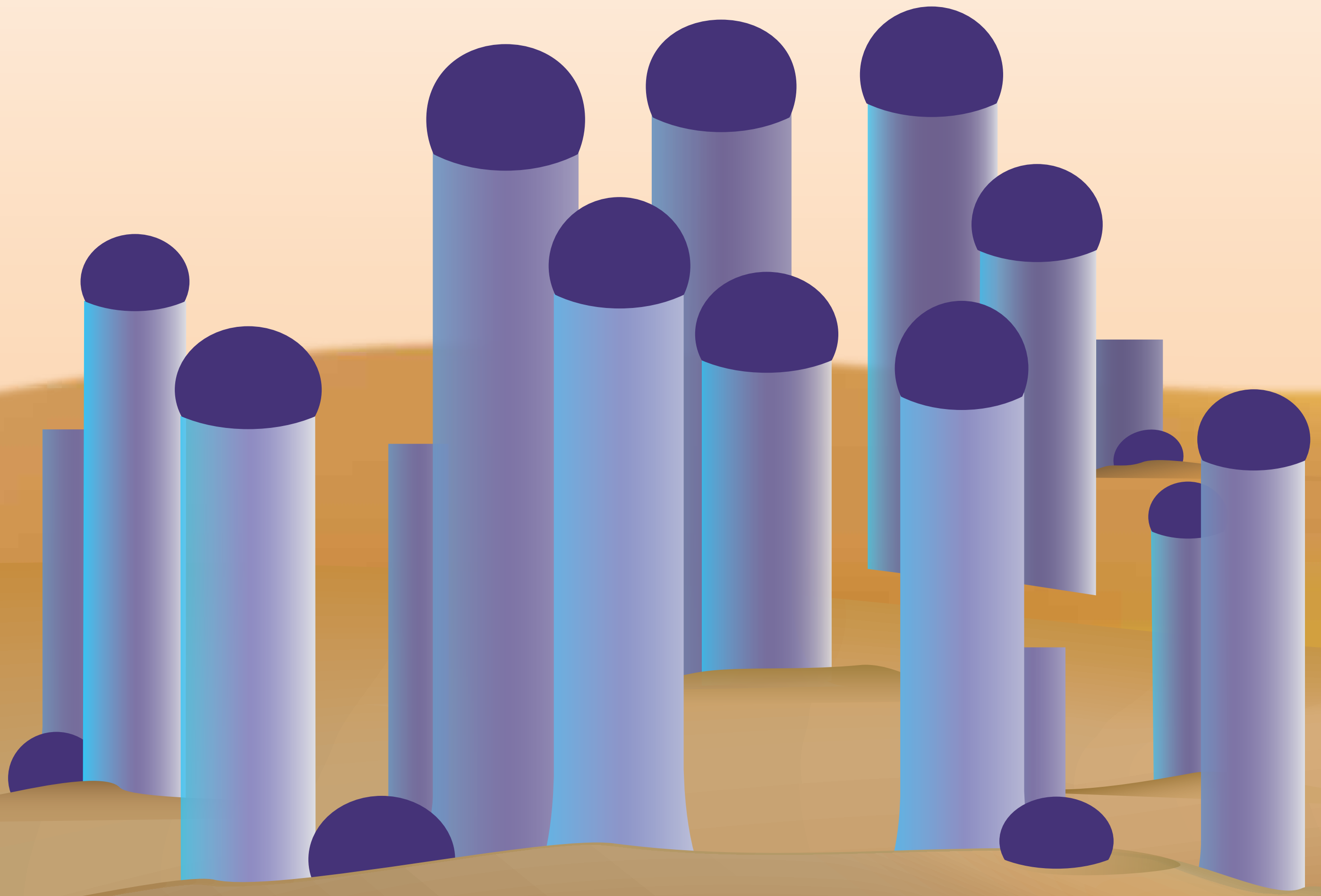
تطوير المواد العضوية في عالم السيلكون

وقدم البروفيسور كارل ليو من جامعة دريسدن للتقنية، محاضرة عن التقدم الحالي والنظرة المستقبلية للخلايا الشمسية العضوية. والبروفيسور ليو هو المدير السابق لمركز أبحاث الطاقة الشمسية والخلايا الضوئية في جامعة الملك عبدالله، ومؤسس شركة هيلياتيك Heliatek حاملة الرقم القياسي العالمي لكفاءة الخلايا الشمسية التي تصنعها والتي بلغت ٪12. وأعرب عن دهشته وخيبت أمله في نفس الوقت أن هذا الرقم القياسي استمر قائماً بعد ثلاث سنوات دون أن يتم تحطيمه. وقال "أعتقد أننا بحاجة إلى بذل المزيد من الجهد والتطوير لتحقيق هدفنا".

تكريم أبحاث جامعة الملك عبدالله

تحدث البروفيسور جان-لوك بريداس، رئيس مركز أبحاث الطاقة الشمسية والخلايا الضوئية في جامعة الملك عبدالله (SPERC)، في ندوة مستقبل الطاقة الشمسية 2015 عن أداء الأجهزة الضوئية العضوية وكيفية تعزيز كفاءة تقنيات الخلايا الضوئية الناشئة -العضوية والهجينة. وحصل البروفيسور بريداس على جائزة الجمعية الكيميائية الأميركية (ACS) في كيمياء المواد وله أبحاث نظرية رائدة في المواد العضوية الجديدة التي يمكن أن تدخل في تطوير أجيال جديدة من أجهزة أشباه الموصلات العضوية مثل شاشات العرض (LED)، والترانزستورات والخلايا الشمسية العضوية. كما سيتم تكريم البروفيسور جان-لوك بريداس في حفل سيعقد في 15 مارس 2016، بالتزامن مع الاجتماع الوطني للجمعية الكيميائية الأميركية (ACS) في سان دييغو، كاليفورنيا، الولايات المتحدة الأمريكية.●

1. Jean-Luc Bredas, distinguished professor and director of the Solar and Photovoltaics Engineering Research Center in the Physical Science and Engineering Division, delivers a keynote lecture during the 2015 Solar Future Symposium on November 9, 2015. By Andrea BachofenEcht.



KAUST VSRP program: adventures in discovery

By Caitlin Clark

The KAUST Visiting Student Research Program (VSRP) began in February 2014, and since then has attracted over 210 visiting research interns from all over the world to the University to experience the unique research environment KAUST offers. At KAUST, VSRP interns engage with world-class faculty, use top-notch research facilities and work in a truly international environment.

VSRP recruits highly motivated students in their baccalaureate or post-baccalaureate studies to carry out research with KAUST faculty members in specific research areas. Most interns stay at KAUST for between three and six months, but are encouraged to consider the University for further studies, including pursuing a KAUST master's degree or Ph.D. program, as many do.

The research intern experience

Mariana Prazeres

Mariana Prazeres completed her undergraduate degree in applied mathematics and computation at the University of Lisbon, Instituto Superior Técnico in Portugal. Although she is from Lisbon, she was keen to experience a new country and different culture, as she had only lived in Portugal before coming to KAUST.

She applied to the VSRP program because her VSRP advisor Diogo Gomes, KAUST associate professor of applied mathematics and computational science, had previously worked at her university in Portugal.

Mariana's VSRP research focused on using the Hamilton Jacobi equation to minimize periodic functions. She is currently a master's degree student at KAUST, and is now studying mean field games under the supervision of Gomes.

"I decided to continue my studies in applied mathematics, and specifically partial differential equations, because of my experience in the VSRP program," she said. "Before attending the program, I had little knowledge of what partial differential equations were, but I knew I enjoyed analysis, and I thought it was a good idea to conduct four months of research on the topic."

Mariana feels that it her VSRP experience was essential to her education and to her future career pathway. "It was good to have research experience before beginning my master's degree to ensure this was something I wanted to do in the future," she noted. "The research experience itself gave me the chance to learn many new tools in mathematics that have given me a much deeper understanding of my field."

Her experience in Saudi Arabia has also impacted her desire to have an international career. "After I finish my studies – which I hope also will include a Ph.D. – I would like to continue my multicultural experience and work in different countries," she said. "My time at KAUST has been an enriching and challenging experience in research with a strong multicultural background."

Renyuan Li

Renyuan Li was the first accepted research intern to the VSRP program. Hailing from China's Inner Mongolia Autonomous Region, he completed his bachelor's degree in engineering at Beijing University of Chemical Technology (BUCT) in 2014.

During his undergraduate studies, he focused on material science engineering "because of the rise of nanomaterials," he explained. "The concept of nanomaterials filled my middle school and high school life, and I realized I wanted to learn about it in-depth."

At KAUST, Li was supervised by Associate Professor of Environmental Science and Engineering Peng Wang. "The VSRP program was exceptional," said Li. "I was told: 'KAUST is amazing – just take a trip there to discover it and work with outstanding faculty and staff.' This is why I chose to apply to the program."

Li focused on studying the design of nanomaterials for environmental protection and pollutant remediation during his time as a VSRP student. Under the supervision of Wang, he examined these materials in the context of microfluidics technology, clean energy generation and catalyst and solar-assisted materials for environmental protection.

"My experience in the VSRP program was very important and highly valuable," Li said. "It certainly benefitted my education. After finishing the program, I was well-trained as a good researcher, and I mastered several critical skills, including how to use the University's research facilities. For me, the program was colorful, meaningful and unforgettable."

Li is currently a Ph.D. student working in Wang's Environmental Nanotechnology Lab. He plans to continue in academia after he finishes his Ph.D. to further pursue his interests and passions in his field.

Melissa Pappas

Melissa Pappas came to KAUST from Eckerd College in St. Petersburg, Florida, U.S., but was born and raised in Arizona, and longed to escape her desert home to study marine biology. Iron-

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ically, after finishing her bachelor's degree in marine science and biology, she came back to the desert – but this time the desert of Saudi Arabia – to progress in the field she loves.

"During my undergraduate degree, I found I wanted to continue studying coral reefs, which brought me to Saudi Arabia. I see the ocean as the most undiscovered yet tangible environment on Earth. The ocean connects human society, and only through studying the ocean will we solve the very relevant issue of climate change," she said.

Melissa's VSRP supervisor was KAUST Associate Professor of Marine Science Michael Berumen. Through the Reef Ecology Lab in the University's Red Sea Research Center, Pappas worked with Berumen to design her own research project examining species of giant clams living in the Red Sea. She also studied the clams' symbiotic algae and microbial communities.

"This research could give us insight into bleaching tolerances for giant clams, and if their symbiotic algae play an important role in these tolerances," she explained. "Giant clams also have a limited range, and not many have been studied in the Red Sea or in general. It is important to determine the diversity of the clams here."

Pappas notes that her VSRP experience has been essential to her education. "If I had not come to KAUST, I would still be struggling to decide what I wanted to study in graduate school," she said. "Now I have a specific topic of interest and useful experience doing that research. VSRP has taken me out of my comfort zone and showed me what it is like to be a scientist, truly directing my passion for marine science in a way that will affect the rest of my professional life."

For the next step in her educational career, Pappas plans to apply to KAUST for a master's degree beginning in September 2016. "My research interests necessitate the accessibility of the Red Sea, and I would like to come back just to work in the KAUST labs," Pappas said.●

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1. The VSRP interns stand at the entrance to Al-Balad while visiting Jeddah's historic old district. Photo courtesy of VSRP program.

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King Abdullah Monument dedication

The King Abdullah Monument was officially dedicated on Dec. 18 prior to Commencement with H. E. Ali I. Al-Naimi, chairman of the Board of Trustees, cutting the ribbon in the presence of Board of Trustees members, honored guests and University administrators. KAUST President Jean-Lou Chameau welcomed the guests to the ceremony, and Nadhmi Al-Nasr, KAUST executive vice president, Administration and Finance, explained the importance and symbolism of the monument and escorted the group through a gallery of photos featuring King Abdullah at KAUST.●

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1. H.E. Ali I. Al-Naimi, chairman of the KAUST Board of Trustees, cuts the ribbon dedicating the King Abdullah Monument surrounded by KAUST President Jean-Lou Chameau, Board of Trustee members, honored guests and Nadhmi Al-Nasr, KAUST executive vice president of Administration and Finance

2. Nadhmi Al-Nasr, H.E. Khalid Al-Falih, minister of health and a KAUST Board of Trustees member, and H.E.Ali I. Al-Naimi pose next to a photograph of King Abdullah and themselves taken at the University's inauguration in September 2009. The photograph is part of the gallery of photos of King Abdullah at the monument.

KAUST receives **Gates Foundation** grant for parasitic weed research

The Bill & Melinda Gates Foundation has approved funding of $1.5 million for KAUST to conduct scientific research towards eradicating a destructive parasitic weed in croplands throughout sub-Saharan African countries.

Commonly known as "witchweed," the Striga hermonthica weed destroys millions of hectares of crops in sub-Saharan Africa every year by siphoning off valuable water and nutrients. Considered one of the hardest parasitic plants to control, Striga infestation devastates much-needed cereal yields, depriving rural families across the region of much of their livelihood. Solutions for eradicating and combating Striga are greatly needed, particularly for pearl millet.

Associate Professor of Bioscience Salim Al-Babili, who is leading this effort at KAUST, explained: "Pearl millet is the staple food crop for millions of rural families in semi-arid regions of Africa, Asia and the Middle East. Striga can destroy an entire year's cereal yield, causing billions of dollars in losses every year. Additionally, Striga is becoming more severe due to climate change conditions. This project aims to provide life-saving Striga control methods to enhance food security in the region and potentially in other parts of the world."

Building on his expertise gained from his work on golden rice, Al-Babili is teaming up with institutions in Burkina Faso, Japan and the Netherlands to shed light on the biological compounds in pearl millet involved in the infestation and to identify low-cost methods for reducing and eventually eliminating Striga seed banks in infested soils.

مؤسسة بيل وميليندا غيتس الخيرية تقدم 1.5 مليون دولار لجامعة الملك عبدالله لأبحاث مكافحة النباتات الطفيلية في أفريقيا

- **تتسبب النبتة الطفيلية (Witchweed) أو ما تسمى بدغل الساحرة بأضرار جسيمة على المحاصيل الزراعية سنوياً**
- **تهدف الأبحاث لتعزيز الأمن الغذائي لملايين البشر في القارة الافريقية**

لندن: 2 ديسمبر 2015 – قررت مؤسسة بيل وميليندا غيتس الخيرية تقديم تمويل قدره 1.5 مليون دولار لجامعة الملك عبدالله للعلوم والتقنية لإجراء أبحاث علمية تهدف للقضاء على النباتات الطفيلية المدمرة للتربة الزراعية في جميع أنحاء البلدان الأفريقية الواقعة جنوب الصحراء الكبرى.

وتعتبر نبتة (Witchweed) أو ما تسمى بالعربية بدغل الساحرة - من أكثر النباتات الطفيلية الضارة التي تدمر ملايين الهكتارات من المحاصيل الزراعية في أفريقيا خصوصًا في المناطق الواقعة جنوب الصحراء الكبرى حيث تجرد التربة من المياه والمغذيات اللازمة لنمو المحاصيل. كما أن السيطرة على هذه النباتات الطفيلة تُعتبر تحدياً كبيراً كونها تهاجم المحاصيل الزراعية المهمة مثل الدخن والذرة والأرز وقصب السكر والنباتات البقولية وغيرها، وبالتالي حرمان الأسر الريفية في جميع أنحاء المنطقة من مصادر الدخل والغذاء.

ويقول الدكتور سالم البابلي، والذي يقود هذا البحث من جامعة الملك عبدالله: " الدخن هو محصول غذائي رئيسي لملايين الأسر الريفية في المناطق شبه القاحلة في أفريقيا وآسيا والشرق الأوسط. وتتسبب النباتات الطفيلية الضارة بتدمير محصول عام كامل منه مما ينتج عنه خسارة المليارات من الدولارات كل عام. بالإضافة إلى ذلك، تفاقمت حدة وتفشي هذه الآفة الزراعية في الفترة الأخيرة بسبب تغير الظروف المناخية. ويهدف هذا المشروع إلى توفير الوسائل المجدية لمكافحة هذه النباتات والحد من انتشارها لتعزيز الأمن الغذائي في المنطقة وفي أجزاء أخرى من العالم."

ويعمل الدكتور سالم البابلي - مستفيداً من خبرته التي اكتسبها في عمله على مشروع الأرز الذهبي - مع فريق بحثي من جامعات مختلفة في بوركينا فاسو، واليابان، وهولندا، لدراسة التركيب البيولوجي لنبات الدخن وتحديد مناطق الاصابة، إضافة الى محاولة تطوير طريقة منخفضة التكلفة تهدف للقضاء نهائياً على بذور النباتات الطفيلية الضارة في التربة المصابة.

وعلق السيد حسن الدملوجي، رئيس قسم علاقات الشرق الأوسط في مؤسسة بيل وميليندا غيتس الخيرية قائلاً: "يواجه جيلنا الحالي تحدي عالمي غير مسبوق لتوفير الغذاء إلى 9 مليارات نسمة بحلول عام 2050. ونحن في مؤسسة بيل وميليندا غيتس الخيرية مدركون أن أحد أهم الحلول المطروحة لهذا التحدي هو دعم المزارعين في أفريقيا. خصوصاً إذا أخذنا في الاعتبار أن سبعة من أصل عشرة أشخاص من الذين يعيشون في البلدان الأفريقية الواقعة جنوب الصحراء الكبرى هم من المزارعين الذين يحتاجون الدعم اللازم لمعالجة الآفات الزراعية مثل تفشي النباتات الطفيلية الضارة لزيادة الإنتاج الغذائي العالمي، وتوفير حياة كريمة لهم ولأسرهم ومجتمعاتهم المحلية."

وأضاف: "إن الاستثمار في المزارعين في أفريقيا يتطلب شراكات عالمية قوية، ولهذا نحن سعداء جداً بالتعاون مع جامعة مرموقة كجامعة الملك عبدالله للعلوم والتقنية والتي تعتبر من الجامعات الرائدة في العالم في مجال أبحاث العلوم الزراعية والبيولوجية. ونحن نتطلع من خلال هذه الشراكة إلى دعم المناطق المعرضة للنباتات الضارة في أفريقيا، وتمكين أفريقيا من تأمين الغذاء لسكانها والمساهمة في إطعام العالم -خلال جيل واحد". ●

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Hassan Al-Damluji, head of Middle East relations at the Bill & Melinda Gates Foundation, commented: "Our generation faces an unprecedented global challenge of feeding nine billion by 2050, and we see Africa's farmers as one of the key solutions to this problem. However, when seven out of 10 people living in sub-Saharan Africa are farmers, it's clear that they will require more support to address issues like Striga infestations in order to not only increase productivity, but also to grow more nutritious food for their families and communities. Investing in Africa's farmers requires strong global partnerships, and this is why we are very pleased to collaborate with KAUST, an institution ranking among the world's leading universities in the fields of agricultural and biological science. Through this partnership, we look forward to supporting Striga-prone areas of sub-Saharan Africa and enabling Africa to be able to feed itself—and help feed the world—within a generation." ●

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1. Postdoctoral fellow Mohamed Ewis (left) discusses his research with Bill Gates at KAUST.

2. Associate Professor of Bioscience Salim Al-Babili leads the KAUST team that is researching ways to control witchweed in Sub-Saharan Africa.

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Inaugural in-Kingdom reunion held at KAUST

خريجو جامعة الملك عبدالله في المملكة العربية السعودية

يحتفلون بأول ملتقى له في الحرم الجامعي

The KAUST Saudi Arabia Alumni Chapter held its first-ever reunion to welcome back alumni living and working in the Kingdom on Friday, November 27, 2015. Attendees from KAUST and throughout the Kingdom participated in the unique celebration, which featured seminars on networking, a women's alumni gathering, a reunion for members of the class of 2010 and other recreational activities.

The event culminated in a dinner hosted by James Calvin, KAUST vice president for Academic Affairs, and the KSA alumni chapter officers Justine Mink (M.S. 2010/Ph.D. 2013), Damian San Roman (M.S. 2010/Ph.D. 2014), Ernesto Sandoval (M.S. 2010), Yasmeen Najm (M.S. 2013), Mariam Awlia (M.S. 2013), Jose Tavares (M.S. 2010) and Mohannad Abdelaziz (M.S. 2011).

The event's afternoon seminar kicked off with a panel discussion during which alumni shared their work-related experiences from different corners of the Kingdom. The panel discussion was followed by a talk about living a life of impact by Hanin Alzubaidy (M.S. 2011, Chemical and Biological Engineering). The afternoon also included a discussion about volunteer opportunities in the Kingdom led by Saudi Initiatives and an improv workshop.

During his speech at the dinner reception, Calvin mentioned that KAUST alumni have an important role in building the University's global reputation. In her speech, Mink, president of the Saudi Arabia Alumni Chapter, highlighted the joy of meeting old colleagues at new stages in their lives. She emphasized the importance of alumni staying connected with each other and with KAUST and asked alumni to think about how to give back to a region that has provided them with so many opportunities.

After the dinner, Saudi Arabia Alumni Chapter officers announced that in January 2016, new chapter officers will be selected. All KAUST alumni residing in Saudi Arabia are eligible to be nominated.

Nearly 250 guests joined the activities throughout the day. Guests included close to 50 alumni from outside of KAUST who arrived mainly from the Eastern Province and 130 alumni working or studying on the University's campus. ●

احتفل نادي خريجي جامعة الملك عبدالله في المملكة العربية السعودية بأول ملتقى لهم في الحرم الجامعي يوم الجمعة 27 نوفمبر 2015 بحضور خريجي الجامعة القدامى الذين يعيشون ويعملون في المملكة بالإضافة إلى مشاركين من جامعة الملك عبدالله وجميع أنحاء المملكة. وتضمن الاحتفال ندوات عن التواصل بين الخريجين وتضمن كذلك بعض الأنشطة الترفيهية.وتوج هذا الحدث بمأدبة عشاء أقامها جيمس كالفين، نائب الرئيس للشؤون الأكاديمية، وجوستين منك رئيسة نادي خريجي جامعة الملك عبدالله في المملكة (دكتوراه عام 2013)، وداميان سان رومان (دكتوراه عام 2014)، وارنستو ساندوفال (ماجستير في عام 2010)، وياسمين نجم (ماجستير عام 2013)، ومريم أولياء (ماجستير عام 2013) وخوسيه تافاريس (ماجستير عام 2010) ومهند عبد العزيز (ماجستير عام 2011).

بدأت الندوة في فترة الظهيرة بحلقة نقاش تبادل خلالها الخريجون الخبرات ذات الصلة بعملهم ، وأعقبها كلمة لحنين الزبيدي (ماجستير عام 2011، الهندسة الكيميائية والبيولوجية) عن كيفية جعل حياتك مؤثرة، كما شملت فترة ما بعد الظهر أيضاً حواراً حول فرص التطوع في المملكة بقيادة المبادرات السعودية وورشة عمل.

وتحدث جيمس كالفين خلال كلمته التي ألقاها في حفل العشاء عن دور خريجي جامعة الملك عبد الله المهم في تعزيز اسم الجامعة في الساحة الأكاديمية العالمية. وألقت جوستين منك رئيسة نادي خريجي جامعة الملك عبدالله في المملكة كلمة عبرت فيها عن سعادتها العميقة في لقاء زملائها القدامى في مراحل جديدة من حياتهم. وشددت على أهمية بقاء الخريجين على تواصل مع بعضهم البعض ومع الجامعة وأوصتهم بالتفكير في كيفية رد الجميل لهذه المنطقة التي قدمت لهم الكثير من الفرص.

وبعد مأدبة العشاء، أعلن مسؤولو نادي خريجي جامعة الملك عبدالله في المملكة أنه واعتباراً من شهر يناير عام 2016 سيتم اختيار مسؤولين جدداً للنادي ويحق لجميع خريجي جامعة الملك عبدالله المقيمين في المملكة العربية السعودية الترشح لهذا المنصب.

شارك ما يقرب من 250 ضيفاً في أنشطة وفعاليات هذا الحدث. وكان من بين الضيوف ما يقرب من 50 خريجاً من خارج الجامعة الذين وصلوا أساسا من المنطقة الشرقية و130 خريجاً يعملون أو يدرسون في الحرم الجامعي.●

1. Professor James Calvin, vice president for Academic Affairs, speaks to KAUST alumni on Friday, November 27 in the University Library.

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جامعة الملك عبدالله تستضيف مؤتمر **تيك تور العربي**

KAUST hosts 2015 **Arabian Tech Tour**

On November 1-3, 2015, KAUST hosted the 2015 Arabian Tech Tour, the first regional version of the international event for leading venture capitalists, high-tech entrepreneurs and industry and government influencers.

"We live in a world where things are happening in a much more chaotic and non-linear way," said KAUST President Jean-Lou Chameau. "It is common to see universities, corporations, startup companies, investors and public organizations interact around innovation and economic development."

The event is part of ongoing efforts by the University's Innovation Fund to support high-tech startups in the Kingdom and introduce them to local and international investors, as well as to encourage top-quality emerging companies from around the globe to establish their activities in Saudi Arabia.

Fostering innovation and economic development in the Kingdom

"We provide an environment at KAUST where people can pursue a good mix of curiosity and more goal- and mission-oriented research," said Chameau. "We see ourselves as playing a major role in fostering innovation and economic development within the Kingdom and around us with different partners."

In addition to supporting startups and entrepreneurs through its incubation and acceleration programs, KAUST is an active investor in startups and early-stage technology companies through the Innovation Fund.

The fund makes venture capital investments from seed to early-stage in promising technology companies in Saudi Arabia and becomes a long-term partner, providing strategic guidance and operational support.

"Our mission at KAUST is to work with others to be a catalyst for innovation, economic development and social prosperity in the Kingdom. We want to create high-value jobs in the Kingdom and ideally fill those with some of our graduates," said Tristan Walker, deputy vice president of Innovation & Economic Development at KAUST. "We aim to attract knowledge-based industries to the Kingdom to partner with us, collaborate with our startups and help catalyze the economy."

Partnering with innovators across the region

This year's Tech Tour attracted talent from across the region and included entrepreneurs from a variety of fast-growing sectors such as renewable energy, clean tech and digital health. Fifty early-stage companies from 15 different countries were selected to present their pitches to over 100 representatives from global investment and venture capital firms and corporate venture organizations. Total assets under management of attending investors are estimated at around $10 billion.

"Sponsoring these kinds of events that allow high-profile entrepreneurs to pitch to international and local VCs is strategic for us," said Nicola Bettio, head of the KAUST Innovation Fund and president of the Tour's Selection Committee. "KAUST is very excited to host Tech Tour and to contribute to the growth of the venture capital ecosystem in the Kingdom." ●

1. Tristan Walker, deputy vice president, Innovation and Economic Development.
2. KAUST President Jean-Lou Chameau

استضافت جامعة الملك عبدالله للعلوم والتقنية مؤتمر تيك تور العربي 2015 في نسخته الأولى في منطقة الشرق الأوسط بحضور قادة المستثمرين ورواد مشاريع التقنية الفائقة والصناعة وشخصيات حكومية رفيعة المستوى.

وقال الدكتور جان-لو شامو، رئيس جامعة الملك عبدالله للعلوم والتقنية: "أصبح من الشائع اليوم أن نرى الجامعات والمؤسسات والشركات الناشئة والمستثمرين والمؤسسات العامة تتعاون وتتفاعل فيما بينها لدعم الابتكار والتنمية الاقتصادية بعد أن كانت جميعها تعمل بشكل عشوائي وفردي في الماضي".

هذا الحدث هو جزء من الجهود المستمرة التي قدمها صندوق الابتكار في جامعة الملك عبدالله للعلوم والتقنية لدعم الشركات الناشئة ذات التقنية العالية في المملكة وتعريفهم للمستثمرين المحليين والدوليين، وكذلك تشجيع الشركات الناشئة المتميزة من جميع أنحاء العالم على إقامة أنشطتهم في المملكة العربية السعودية.

رعاية الابتكار والتنمية الاقتصادية في المملكة

وقال الرئيس شامو: "توفر جامعة الملك عبدالله بيئة فريدة من نوعها تتيح للباحث مجموعة متنوعة من الأبحاث التي يحركها الفضول أو تلك الموجهة لتحقيق هدف معين. وتسعى جامعتنا إلى أن تكون لاعباً رئيسياً في تشجيع الابتكار والتنمية الاقتصادية مع مختلف الشركاء في المملكة العربية السعودية وما حولها."

وتدعم جامعة الملك عبدالله الشركات الناشئة ورواد الأعمال من خلال برامج حضانة المشاريع وبرامج التسريع. وتستثمر بفاعلية في الشركات الناشئة وشركات التقنية في مراحلها المبكرة من خلال صندوق الابتكار الذي يقدم تمويلاً تأسيسياً لشركات التقنية الواعدة في المملكة ويصبح على المدى البعيد شريكاً عبر توفير التوجيه الاستراتيجي والدعم التشغيلي لهذه الشركات.

ويقول تريستان وكر، نائب الرئيس للابتكار والتنمية الاقتصادية في جامعة الملك عبدالله: "مهمتنا في الجامعة هي تحفيز الآخرين على الإبداع وتشجيع التنمية الاقتصادية والرخاء الاجتماعي في المملكة. ونهدف أيضاً لتوفير فرص عمل قيمة في المملكة وشغلها ببعض من خريجي الجامعة فضلاً عن جذب الصناعات القائمة على المعرفة إلى المملكة والتعاون مع الشركات الناشئة لتحفيز الاقتصاد."

الشراكة مع المبتكرين في المنطقة

جذب مؤتمر تيك تور لهذا العام المواهب من مختلف أنحاء المنطقة وشملت رواد المشاريع في مجموعة متنوعة من القطاعات سريعة النمو مثل الطاقة المتجددة، والتقنية النظيفة والصحة الرقمية. وقد تم اختيار خمسين شركة ناشئة من 15 بلداً مختلفاً لتقديم أفكار مشاريعهم لأكثر من 100 ممثل لمستثمرين عالميين وشركات رأس المال الاستثماري والمنظمات الاستثمارية الأخرى. ويقدر إجمالي الأصول المدارة من المستثمرين الذين حضروا المؤتمر بنحو 10 مليار دولار.

وقال نيكولا باتيو، رئيس صندوق الابتكار في جامعة الملك عبدالله ورئيس لجنة الاختيار لهذه الجولة: "رعاية هذه الأنواع من الفعاليات التي تسمح لرواد المشاريع المتميزة بطرح أفكارهم الى المستثمرين الدوليين والمحليين هو هدف استراتيجي بالنسبة لنا. وقد تشرفت جامعة الملك عبد الله باستضافة مؤتمر تيك تور لهذا العام نظراً لدورها البارز في دعم نمو بيئة رأس المال الاستثماري في المملكة." ●

My University

Frederico Silva

Frederico Silva joined KAUST from Greenville, South Carolina in the U.S., where he worked for 12 years in an engineering institute. Originally from São Paulo, Brazil, Silva was responsible for starting the international admissions offices at two different institutes, and this experience served him well for his current position as an enrollment specialist in Saudi Initiatives.

Silva was drawn to KAUST because he heard about it frequently at his previous employer. "The more I learned about KAUST, the more my respect and admiration for the University and its mission grew," he said. "Also, the Middle East has always been my favorite place to travel to. Having the opportunity to join a world-impacting institution while living in my favorite part of the world brought personal and career goals together."

At KAUST, Silva is able to fulfill his passion for international education. "While many universities infuse small international components throughout their overall portfolio, the DNA of KAUST is truly international. No other university can say the same," he said.●

Where do you read The Beacon?

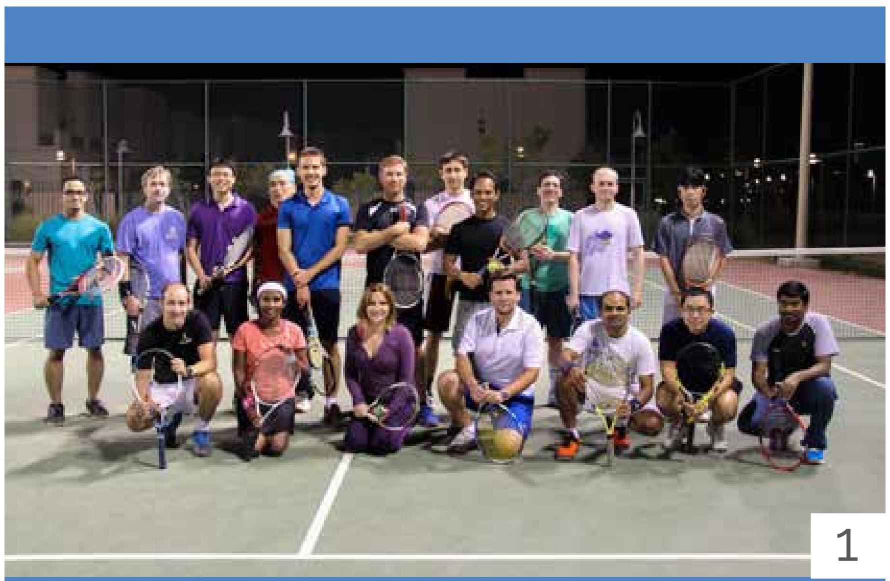
This month's submission comes from Alison Rankin, a project coordinator in the University's Physical Science and Engineering Division. In October 2015, Rankin traveled the overland route connecting Lhasa, the administrative capital of the Tibet Autonomous Region, with Mount Everest's North Base Camp in Tibet.

"Tibet is a place I have always been fascinated by, and as I traveled to Base Camp, I experienced one of the most beautiful land routes on the planet," she said.

The route covers 900 kilometers (560 miles) and took Rankin from Lhasa across pristine high-altitude lakes, rivers, glaciers and farming valleys and through the Himalayas to Everest Base Camp.

"At around 5,200 meters above sea level, Base Camp offers amazing sweeping views of the world's highest peak," noted Rankin. "Everest's summit soaring at 8,848 meters above sea level seemed tantalizingly close to me in the crisp, pure blue sky."

While at Base Camp, Rankin found the natural beauty of Everest unrivaled. "I feel very privileged to have come up close and personal with the 'Roof of the World,'" she said. ●



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Social tennis at KAUST

Social tennis is a great way for KAUST community members to stay fit, meet new people and improve their playing skills. Every Sunday from 7:30pm to 9:00pm, a group of around twenty participants gather at the Garden School courts. The activity is open to any players who can serve, rally and score to basic level or further. "Everybody that comes here has improved a lot," said Racquet Club manager and tennis instructor Nicholas Firth. "There are players of diverse standards, some stronger than others, but it's mainly aimed at catering to mixed standards."

"You get to meet new people almost every time and it's a great opportunity to have fun," said Bioscience Ph.D. student Michael Margineanu. A more experienced tennis player who's been playing since the age of ten in his native Romania, he's been attending social tennis at KAUST for the past two years. "It's nice because you have people of different levels here," he said.

Another social tennis participant, Claudia Carraro who works as a safety officer in the Catalysis Center, said she enjoys playing tennis with people from different nationalities. Having also been going to social tennis for the past two years, she said: "I've seen people start out as just beginners and improve very quickly just by playing every week, on a regular schedule."

All the participants agree that social tennis is an ideal way to make friends. Many people become tennis buddies and end up meeting during the week to play regularly.

The social tennis group has met off the courts for dinner together and there are even trips in the planning stages. "We're looking into doing things like going to play against other players in Kuwait and also going to watch some professional tournaments in Dubai, Abu Dhabi or Qatar," said Firth. ●

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1. The social tennis group meets every Sunday at the Garden School courts at 7:30pm.

2. In addition to the Sunday sessions, singles and doubles tournaments are also organized.